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AUGUST, 1894.

STARCHES IN DIFFERENT COMMERCIAL VARIETIES OF CACAO.

By Edson S. Bastin.

The genus *Theobroma*, of the natural order *Sterculiaceæ*, is a small one, consisting of nine or ten species, all of them natives of tropical America. The seeds of several of these are said to be more or less used in the countries in which they grow, but there seems to be no question that those which, under the name of Cacao, constitute such an extensive article of commerce, are almost wholly derived from *Theobroma Cacao* of Linnæus. This species is a native of Mexico, and probably also of the northern portions of South America, and it is extensively cultivated in Mexico, Central America, Peru, Ecuador, Brazil, New Granada, Venezuela, Guiana, and in most of the West India Islands. It has also been introduced and is successfully cultivated in Java and some other tropical countries of the Orient.

The plant is a small tree, attaining a height of from fifteen to twenty feet, with cylindrical, grayish stems and branches; large, petiolate, stipulate, oval-lanceolate or oblong-lanceolate pendant leaves; small pentamerous, complete flowers, which form few-flowered clusters, mostly on the larger branches. The fruits, which usually occur singly, present a striking appearance because not borne on the young twigs, as are most fruits, but on the sides of the main stem or older branches. They are large, pendant, berry-like fruits, eight or ten inches long, somewhat pear-shaped, pointed at the apex, distinctly ten-ribbed longitudinally, and more or less wrinkled or irregularly furrowed, in a transverse direction. They are yellow or

reddish when ripe. In the pulpy interior are five loculi which contain from twenty to forty or more seeds. One of the fruits is shown, sectioned transversely, in *Fig. 1A.*

The seeds are enveloped in a fleshy exterior coat, which, in preparing them for commerce, is usually removed. These seeds are three-fourths of an inch to an inch in length, somewhat compressed and irregularly ovate or ovate-oblong in form. The outer remaining coat is reddish-brown, with several conspicuous, branching veins

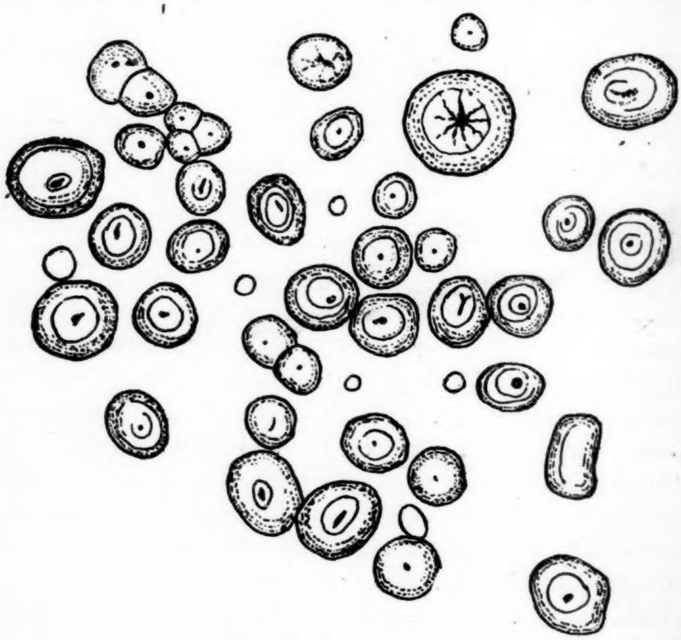

FIG. 3.—Starch from Ariba Cacao. × 1500.

radiating from the chalaza, and running toward the hilum and micropylar end as shown in *Fig. 1B.* This coat is tough-papery in consistency, and when stripped off, exposes a very delicate inner coat, which is closely applied to the embryo and follows its convolutions. The seed is almost destitute of albumen, the latter being represented only by a small quantity of mucilaginous material in the folds and creases of the cotyledons.

The embryo, after the seed coats have been removed, is shown in *Fig. 1C.* Its thick, fleshy and somewhat unequal cotyledons are strongly creased and crumpled. The color varies greatly in different

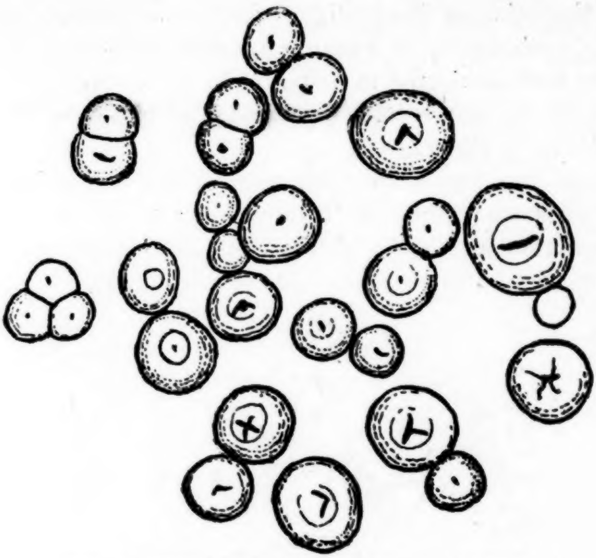

FIG. 4.—Starch from Tabasco Cacao. × 1500.

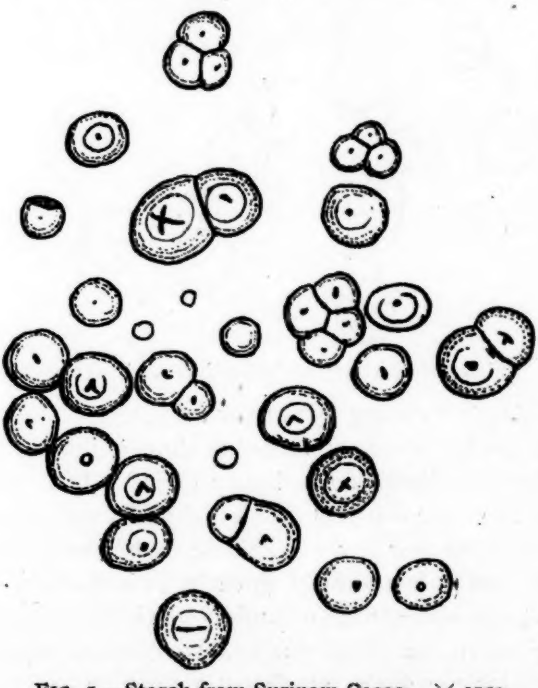

FIG. 5.—Starch from Surinam Cacao. × 1500.

commercial specimens, from a light brown to a deep reddish-brown, depending probably on the degree of fermentation to which the seeds have been subjected in preparing them for the market. The embryo, with the cotyledons separated and exposing their inner faces, is shown in *Fig. 1D.*

The cacao tree has been under cultivation since before the discovery of America; how long before, of course, we do not know, and it is natural to expect that a plant so long under cultivation would now exist under a considerable number of cultivated varieties

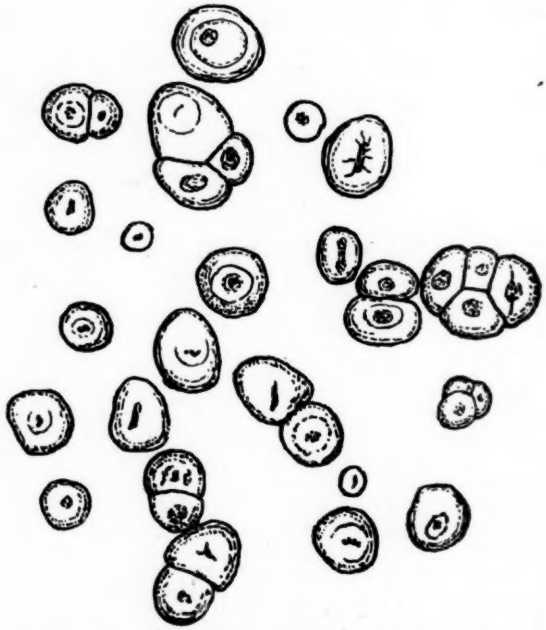

FIG. 6.—Starch from Bahia Cacao. × 1500.

or forms. This is to some extent the fact, though the varieties do not appear so numerous or so marked as those of many other species that have been cultivated for so long a period. It is well known, though, that there are different grades of cacao seeds, some highly prized, others of inferior flavor. This depends, partly, no doubt, on the methods and care observed in curing, which differ in different localities, but also somewhat, probably, on soil and climate, and on those variations in the plant due to more obscure causes. Naturally, it is desirable to know whether it is possible to distinguish by

microscopic or other characters between the more desirable and the less desirable commercial varieties, and ten different samples were

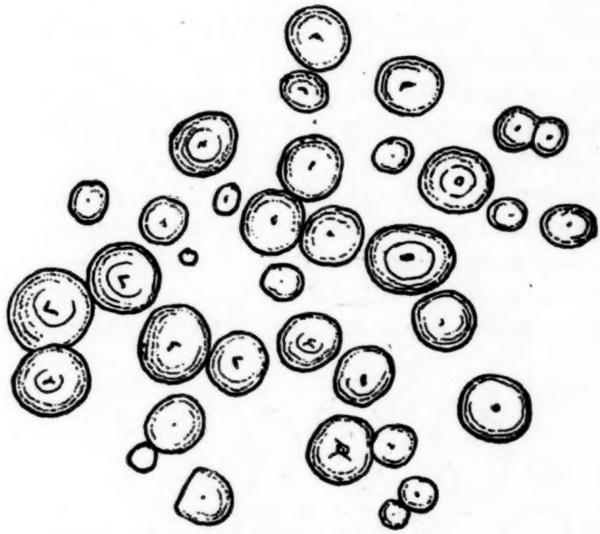

FIG. 7.—Starch from Machalle Cacao. × 1500.

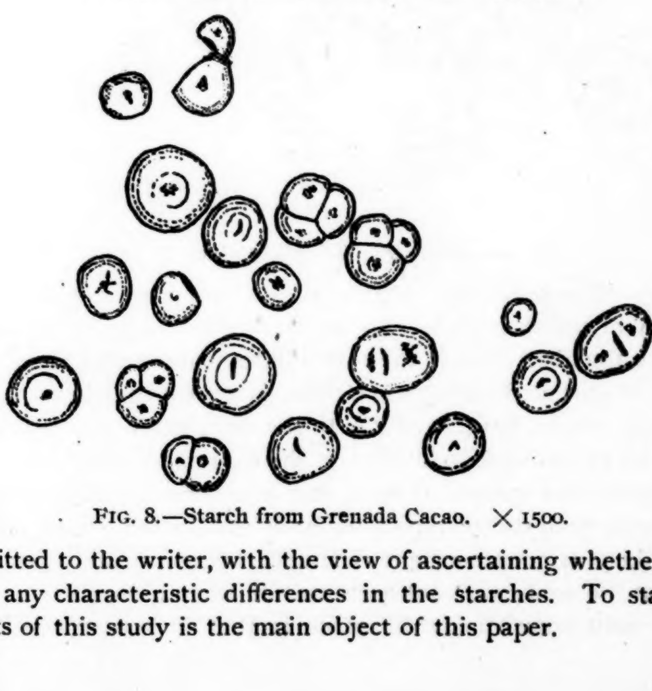

FIG. 8.—Starch from Grenada Cacao. × 1500.

submitted to the writer, with the view of ascertaining whether there were any characteristic differences in the starches. To state the results of this study is the main object of this paper.

The following are the commercial varieties examined: Ariba, Caracas, Trinidad, Bahia, Surinam, Maracaybo, Machalle, Granada, Tabasco and Java.

Starch is rather abundant in cacao, on the average about 20 per cent., but unless the sections are very thin, it is difficult to recognize in the cells, owing to the abundance of fat (which, at ordinary temperatures, is in the crystalline form), granular proteids and brown coloring matters. Treatment with ether to dissolve out the fat renders the sections clear enough so that the grains are easily seen. A small portion of a thin section of one of the cotyledons of Ariba cacao is shown, magnified 750 diameters, in *Fig. 2*; *a* and *g* are intercellular spaces; *b*, cell-wall; *c*, starch grain; *d*, fat crystals; *e*, cell nucleus still visible in some cells; and *f*, granular protoplasm.

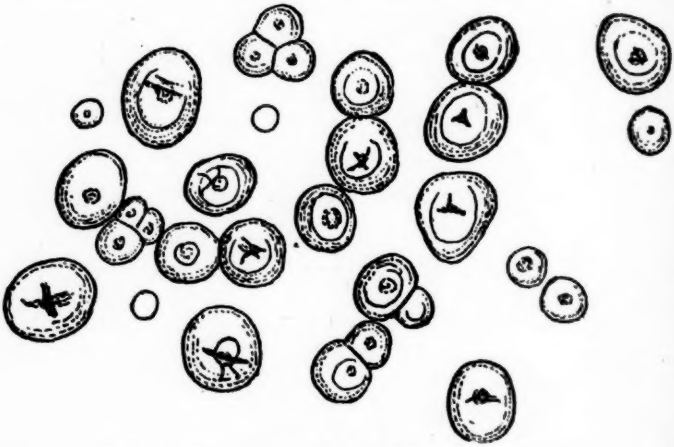

FIG. 9.—Starch from Trinidad Cacao. × 1500.

Some differences were found, in the different samples, in the quantity of starch present. In the Machelle variety, for example, it was less abundant than in the rest; but, as many grains showed evidences of partial disintegration, there is reason to believe that this difference might have been due to the destruction of a part of the grains by excessive fermentation in the example studied.

In some other specimens, as in the Caracas variety, there appeared to be more than the average number of small-sized grains, but this, most likely, is not a constant difference, being probably due to the fact that the seeds were not quite mature when gathered.

The most conspicuous difference is that in some varieties the

compound grains were quite numerous, while in others they were relatively few. For example, in the Surinam, Bahia and Caracas

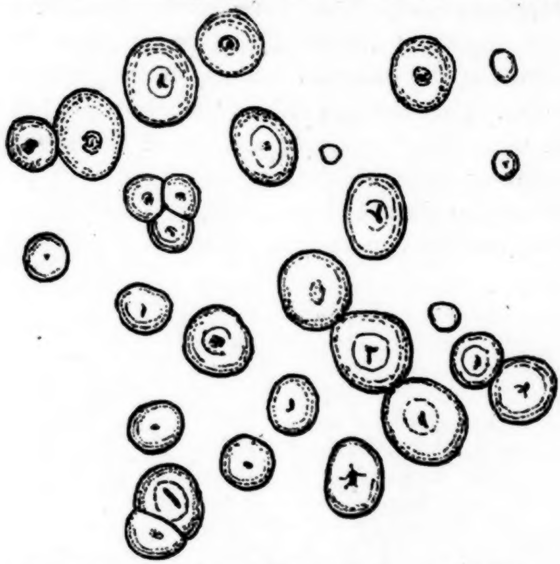

FIG. 10.—Starch from Maracaybo Cacao. × 1500.

varieties they were very numerous, while in the Java, Tabasco and Ariba varieties, they were few. What the real significance of these

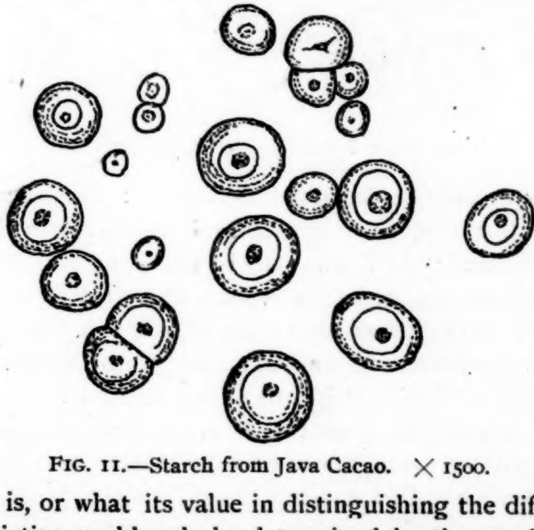

FIG. 11.—Starch from Java Cacao. × 1500.

differences is, or what its value in distinguishing the different commercial varieties, could only be determined by the careful compari-

son of a very large number of samples. It seems to the writer very doubtful, indeed, if any differences sufficiently constant to be relied upon for diagnosis can be found between the starches.

The most important result of the investigation is rather the proof it affords of the essential likeness of the starches of the different varieties. Considering the long time the plant has been under cultivation, the widely separated sources of the samples, and the varied conditions under which they must have been produced, the likeness among the starches is surprising. This will be evident to anyone who gives the figures a careful study.

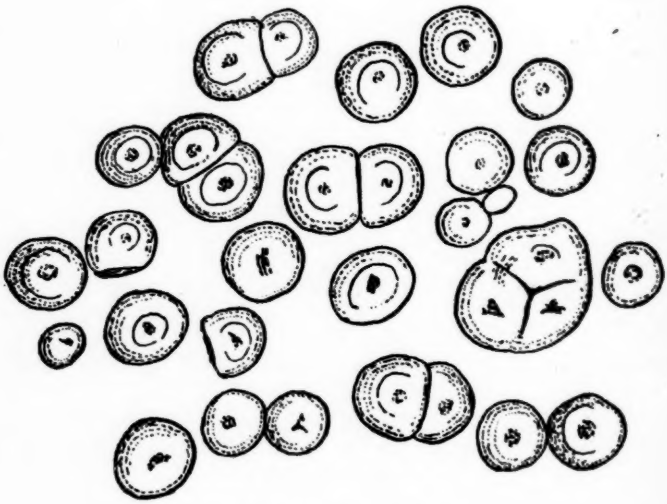

FIG. 12.—Starch from Caracas Cacao. × 1500.

The starches may be described as follows: Grains spherical, or nearly so, when simple; hilum central, usually quite distinct and sometimes fissured; the fissure may be simple and straight or somewhat curved, angular or stellate; one, or sometimes two circular lines, usually quite distinct about the hilum, but the grains otherwise mostly unmarked and smooth; some of the grains compound, and these may be double, triple or even quadruple.

To those acquainted with the forms and structure of different starches, it will be evident from this description and from a study of the figures, that the starches of the cacaos, while resembling each other very closely, are yet quite unlike those of other drugs,

and could not, by the careful student, easily be confounded with them. It is very unusual for grains so minute to show a structure so distinct, particularly for the hilum and micropyle to stand out with such distinctness as they do in the cacao starches.

INDIAN TANNING MATERIALS.*

By David Hooper,

Quinologist to the Government of Madras.

	Per Cent. Tannin.		Per Cent. Tannin.
Bridelia montana,	39·9	Ficus indica,	10·9
Acacia pycnantha,	33·8	Mimusops hexandra,	10·3
Acacia decurrens,	33·4	Flueggia leucophlœa,	10·3
Terminalia Chebula (nuts),	31·0	Eugenia caryophyllifolia,	10·1
Psidium Guyava,	27·4	Mimosa pudica,	10·0
Kandelia Rheedii,	27·4	Cylista scariosa,	9·9
Acacia Melanoxylon,	26·8	Schlachera trijuga,	9·4
Acacia leucophlœa,	20·8	Odina Wodier,	9·1
Woodfordia floribunda,	20·6	Flueggia microcarpa,	8·9
Acacia Arabica,	20·5	Acacia pinnata,	8·8
Cassia auriculata,	20·1	Careya arborea,	8·7
Rhodomyrtus tomentosa,	19·5	Hiptago Madablota,	8·5
Macaranga Roxburgii,	18·4	Eleodendron glaucum,	8·0
Casuarina equisetifolia,	18·3	Albizzia Lebbec,	7·4
Cicca disticha,	18·1	Potentilla Seschenaultii (root),	7·4
Phyllanthus Emblica,	18·0	Litsæa Zeylanica,	7·3
Acacia dealbata,	17·8	Terminalia glabra,	7·2
Terminalia belerica,	17·4	Mimusops Elengi,	6·8
Bassia longifolia,	17·0	Mallotus phillippinensis,	6·5
Mangifera indica,	16·7	Cassia Roxburghii,	6·1
Eugenia arnottiana,	16·1	Thespesia populnea,	6·0
Terminalia arjuna,	16·0	Litsæa Wightiana,	5·8
Anogeissus latifolia,	15·5	Saraca indica,	5·7
Dyospyros embryopteris,	15·0	Ficus gibbosa,	4·3
Saxifraga ligulata,	14·2	Cassia florida,	4·1
Ficus racemosus,	14·1	Terminalia tomentosa (fruits),	4·0
Myrica Nagi,	13·7	Ficus religiosa,	3·8
Cassia Fistula,	12·9	Acacia farnesiana,	2·8
Diospyros (fruits),	12·4	Lizyphus vulgaris,	2·8
Eugenia Jambol,	12·4	Rhamnus Wightii,	2·6
Eugenia Jambolana,	12·0	Ficus hispida,	2·1
Eugenia montana,	11·9		

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*This list of tanning materials has been received from our honorary member at Ootacamund, India. It was compiled, and the percentages of tannin determined by him. The results have not appeared elsewhere, except in his report to the British Government. They are, therefore, considered especially desirable for placing on record in this country.—*Editor.*

ELIXIR OF PHOSPHATE OF IRON, QUININE AND STRYCHNINE.

BY CHARLES T. HELLER, PH.G.

Read before the Minnesota Pharmaceutical Association, June 12, 1894.

In reading the Pharmaceutical Journals of the last few years, one is struck with the frequency in which the editors are asked: What is the matter with this or that formula? In March last the American Druggist asked its readers, who had experimented with this elixir, to give a general account of the process they employed. Several answered the request, but in the writer's opinion the working of some of the formulas was too complicated, and others failed to be satisfactory in not mixing clear with water, making such an unsightly mixture that it nauseates the patient.

The formula which I have used for the past three years has always given entire satisfaction; the elixir is easily made, miscible with water, and cost twenty-eight cents per pint—but a few cents more per pint than that made from the sulphates. If time were counted in cost, my formula would be the cheaper. Each fluid drachm contains two grains phosphate of iron, one-half grain quinine and one hundredth of a grain of strychnine.

The formula is as follows:

Phosphate of Iron, U. S. P.,	256	grs.
Quinine (alkaloid),	64	"
Strychnine, "	1¼	"
Alcohol,	2	fl. oz.
Water,	2	"
Syrup,	2	"
Aromatic Elixir, q. s. ad.,	16	"

Dissolve the phosphate of iron in the water, quinine and strychnine in the alcohol, mix the two solutions, shake, add the syrup and lastly the aromatic elixir. Set aside a short time, and filter if necessary.

There is one point in making the elixir I wish to call attention to; in adding the iron solution to the solution of the alkaloids, a thick curdy precipitate occurs; do not be alarmed at this, but continue as directed. Set the elixir aside and it will clear up in from a half hour to an hour.

I have made the elixir, when it has, for some unknown reason to me, taken three or four hours to clear, but the usual time is from one-half to one hour.

St. Paul, Minn., June, 1894.

A REJOINDER ON SOLUTIONS.

Editor of the AMERICAN JOURNAL OF PHARMACY.

DEAR SIR:—In the July number of the AMERICAN JOURNAL OF PHARMACY I observe a note by Mr. Louis Kahlenberg, of the University of Wisconsin, criticising mildly the propriety of my paper on "Change of Volume when Liquids of Different Densities are Mixed."

Mr. Kahlenberg has either overlooked or failed to appreciate the very significant statement at the beginning of my paper, that "it has been known for some time that solutions of salts contract when diluted"—a fact of which I was fully aware at the time, since previous to writing that paper I had written a "Study of Solution," which was published in the March number (1893) of the *Pharmaceutical Review*, and subsequently copied into several of our pharmaceutical journals, which "study" was essentially a digest of the recent hypotheses of solutions as given in the English translation of Professor Ostwald's masterly work on "Solution." In this article note was also made of the thermal and optical properties of solutions, and full credit given to Professor Ostwald's publication.

But in order to further clear up the misapprehension which apparently exists over the purpose of that paper, kindly allow me to briefly state the circumstances which called it forth. At the visit of the American Pharmaceutical Association to Boston, in July, 1892, I became engaged in a friendly controversy with the professor of pharmacy in a sister college over the question whether contraction takes place when glycerin and water are mixed.

This discussion took place in the presence of a score or so of professors representing a number of colleges throughout our country, and by their interest in the discussion, and silence as regards the points involved, I inferred that the subject was new to them, and, therefore, that the fact as given by Professor Ostwald was not *well* known, at least to the pharmacists of America. On subsequently learning these facts through reading Professor Ostwald's book, in which I was very much interested, I was constrained to write and publish the "Study of Solution" for the purpose of calling the attention of our pharmacists to the newer theories of solution, and subsequently reinforced this by the paper on Contraction, the few isolated experiments of which were performed

solely for the purpose of demonstrating, in a measure, the *significance* of this *long*-known, but hitherto not *well*-known, fact to pharmacy.

Very truly yours,

WILBUR L. SCOVILLE.

BOSTON, MASS., July 13, 1894.

POTASSIUM IODIDE AND BROMIDE OF THE MARKET—DO THEY COME UP TO THE REQUIREMENTS OF THE PHARMACOPŒIA?

BY G. H. CHAS. KLIE.

Read before the Missouri Pharmaceutical Association, June, 1894.

POTASSIUM IODIDE.

The Pharmacopœia gives the following tests for potassium iodide:

Solubility of a given quantity of the salt in a given quantity of dilute alcohol, specific gravity 0·928.

A test for the alkali limit.

The salt must not contain sodium, iodate, sulphate, arsenic, lead, copper, nitrate or nitrite, iron, cyanide. The purity percentage, which is given as 99·5 per cent., is determined volumetrically.

Twelve samples of potassium iodide were purchased in the market. The intention was to examine the brands used in the United States only.

Except three, all samples were granulated. They were obtained from eight firms. From four, two samples each, and from four, one each, were obtained.

The granulated salt was chosen, because it is used most. As a rule, the granulated salt is not as pure as the crystallized. Crystallization will exclude many impurities which remain in the salt when granulated.

Sample No. 1 was not as soluble as the test demands; contained too much alkali. It also contained sodium sulphate, and did not show the purity percentage required.

Sample No. 2 contained an appreciable amount of sulphate, and did not come up to the standard of purity percentage.

No. 4 had an appreciable quantity of sulphate and ammonia, and could not be placed under the heading, standard, as to purity percentage.

No. 5 contained ammonia, and did not conform to the standard of purity percentage.

No. 6 was alkaline, contained sodium, freely of iodate and sulphate, and did not reach the purity percentage required.

No. 7 was all right in every respect, except that it did not conform to the test for purity percentage.

No. 9 contained traces of ammonia only.

No. 10 contained traces of ammonia, and did not reach the purity standard.

No. 11 showed traces of ammonia, and did not reach the purity standard.

No. 12 contained traces of sulphate, an appreciable amount of ammonia, and did not come up to the purity percentage required.

Samples 3 and 8 conformed to all requirements of the Pharmacopœia.

Next best was No. 9.

Sample No. 6 was the worst of the lot. It contained a considerable amount of iodate, which is a very dangerous contamination.

POTASSIUM BROMIDE.

The Pharmacopœia gives a large number of tests for potassium bromide. The main ones are as follows:

The salt should give a neutral or very slightly alkaline reaction.

The addition of chloroform and chlorine water to a solution of the salt should not develop a violet tint.

Potassium carbonate limit is given.

The salt must not contain sodium, bromate, iodine, iron and aluminium, arsenic, lead and copper, calcium, barium, sulphate, iron.

The absence of more than 3 per cent. of chloride is determined volumetrically.

Eight samples were obtained from seven firms. Of these, two samples were from one firm.

Sample No. 2 contained traces of sodium and sulphate.

Sample No. 3 showed traces of sodium, and did not reach the standard for absence of chloride.

Sample No. 4 was all right in every particular, except that it contained too much chloride.

Sample No. 5 showed traces of sodium and sulphate. It contained too much chloride.

No. 6. The only fault found in this sample was an appreciable amount of sulphate.

POTASSIUM IODIDE.	Solubility in Dilute Alcohol Sp. Gr. 0·928.	Alkali Limit.	Sodium.	Iodate.	Sulphate.	Ars'nic Lead, Copper	Nitrate, Nitrite.	Iron.	Cyanide.	Purity Percentage.
Sample No. 1	Not complete.	Beyond.	Present.	None.	Appreciable.	None.	None.	None	None.	Not standard.
" " 2	Complete.	Within.	"	"	"	"	"	"	"	" "
" " 3	"	"	None.	"	None.	"	"	"	"	Standard.
" " 4	"	"	"	"	Appreciable.	"	Appreciable.	"	"	Not standard.
" " 5	"	"	"	"	None	"	"	"	"	" "
" " 6	"	Beyond.	Present.	Large Amount.	Appreciable.	"	None.	"	"	" "
" " 7	"	Within.	None.	None.	None.	"	"	"	"	" "
" " 8	"	"	"	"	"	"	"	"	"	Standard.
" " 9	"	"	"	"	"	"	Traces.	"	"	"
" " 10	"	"	"	"	"	"	"	"	"	Not standard.
" " 11	"	"	"	"	"	"	"	"	"	" "
" " 12	"	"	"	"	Traces.	"	Appreciable.	"	"	" "

POTASSIUM BROMIDE.	Reaction.	Violet Tint.	Limit Potassium Carbon.	Sodium.	Bromate.	Iodine.	Iron Aluminum.	Arsenic. Lead, Copper.	Calcium.	Barium.	Sulphate.	Iron.	Absence of more than 3 per cent. Chloride.
Sample No. 1	Neutral.	None.	Within.	None.	None.	None.	None.	None.	None.	None.	None.	None.	Standard.
" " 2	Alkaline.	"	"	Traces.	"	"	"	"	"	"	Traces.	"	"
" " 3	Neutral	"	"	"	"	"	"	"	"	"	None.	"	Not standard.
" " 4	"	"	"	None.	"	"	"	"	"	"	"	"	" "
" " 5	"	"	"	Traces.	"	"	"	"	"	"	Traces.	"	" "
" " 6	"	"	"	None.	"	"	"	"	"	"	Appreciable.	"	Standard.
" " 7	Alkaline.	"	"	Traces.	"	"	"	"	"	"	Traces.	"	Not standard.
" " 8	Neutral.	"	"	None.	"	"	"	"	"	"	"	"	" "

Sample No. 7 showed traces of sodium and sulphate. It did not reach the standard as to chloride.

Sample No. 8 contained traces of sulphate and more chloride than the standard calls for.

Samples Nos. 3 and 6 met all requirements as to chloride.

Sample No. 1 conformed to all requirements of the Pharmacopœia.

Of the twelve samples of potassium iodide examined, two only, both from the same firm, met all pharmacopæial requirements. However, it should be mentioned here that these samples were of the crystallized salt. The firm makes no granulated potassium iodide.

Of the eight samples of potassium bromide, one only stood all the tests of the Pharmacopœia.

The answer, therefore, to the question: Potassium iodide and bromide of the market—do they conform to the requirements of the Pharmacopœia? must be answered: No! the large majority do not.

CALCIUM PHOSPHOGLYCERATE.

This compound was discovered by Pelouze, who prepared the acid by acting on glycerin with anhydrous phosphoric acid. Recently Portes and Prunier (*Jour. de Pharm. et de Chim.*, [5] **29**, 393) have prepared the acid by heating together 3 kilograms of 60 per cent. liquid phosphoric acid and 3·6 kilograms of pure glycerin, at 110° for six days. The mixture should be agitated three or four times a day. After two days it becomes colored and emits vapors. When completely cold the acid is saturated with a mixture consisting of 500 grams of calcium carbonate in 2 kilograms of water. The resulting product is allowed to stand for two or three hours, when saturation is completed by a further careful addition of calcium carbonate and water.

The solution is filtered, precipitated with alcohol, the precipitate collected by decantation and allowed to become air-dry; it is then dissolved in cold water, filtered, and the solution brought very carefully to dryness.

When thus obtained the salt is white, somewhat crystalline powder, soluble in fifteen parts of cold water, almost insoluble in boiling water, and insoluble in alcohol. The solution does not give the reaction of phosphoric acid when mixed with ammonium molybdate. The use of this salt has become established in some of the hospitals of Paris. Its especial value lies in its perfect neutrality and in the readiness with which it is assimilated.

REPORT OF RESEARCH COMMITTEE B.

To the Committee of Revision of U. S. P., 1890.

NO. I.

BY DR. CHAS O. CURTMAN.

Read before the Missouri Pharmaceutical Association, June, 1894.

A number of experiments have been made for the purpose of ascertaining the conditions most favorable to the result of the test for arsenic by stannous chlorid (Bettendorf's test and its modifications).

The inquiry was directed to the following points:

(1) The limit of sensitiveness of the test in its various modifications.

(2) The best proportion of reagent to specimen.

(3) The influence of the use of metallic tin together with the stannous chlorid.

(4) The influence of the presence of other substances in the specimen tested.

I. LIMIT OF SENSITIVENESS.

The following reagents were used:

(*a*) The solution directed for Bettendorf's test by the U. S. P., consisting of a saturated solution of pure stannous chlorid in pure concentrated hydrochloric acid. The specific gravity of this solution was = 1·467.

(*b*) Metallic tin, perfectly pure, in thin cylinders, from which shavings of about 0·1 gm. were taken as needed.

(*c*) Stannous chlorid solution prepared according to the German "Arzneibuch" by saturating a mixture of 5 parts of crystals of stannous chlorid and 1 part of hydrochloric acid with dry hydrochloric acid gas. The specific gravity was = 1·912.

All of the materials used were previously tested for absence of arsenic by Gutzeit's test, so as to exclude any fallacies arising from the introduction of even small traces of arsenic by the reagent, which might cumulate with those in the specimen.

It was easy enough to procure pure metallic tin, but impossible to obtain from local dealers, hydrochloric acid sufficiently free from arsenic to stand Gutzeit's test for one hour; so that I had to distill from purified sulphuric acid and pure sodium chlorid the hydrochloric acid required for the preparation of the reagents.

A number of specimens of arsenic solution were made, containing free trioxid, sodium metarsenite and sodium arsenate, in such proportion that each set corresponded exactly to an equal amount of As. They were: *Arsenic trioxid* ($As_2O_3 = 197{\cdot}68$), of which 1·31962 gm. contain 1 gm. of As.

Sodium metarsenite ($NaAsO_2 = 128{\cdot}82$), of which 1·7332 gm. contain 1 gm. of As.

Sodium arsenate, U. S. P. ($Na_2HAsO_4 + 7{\cdot}H_2O = 311{\cdot}46$), of which 4·51834 gm. contain 1 gm. of As.

The solutions used for experiments contained from 0·5 gm. to 0·01 gm. of As.

Of these 1 cc. was used for each trial and the amount of reagent mixed with this varied from 1 cc. to 3 cc. so as to correspond with the limits prescribed in the pharmacopœial tests. When metallic tin was added to the reagent, 1 cc. each of the specimen and the stannous chlorid solution was used. In some cases of doubt a tenfold quantity (10 : 30 cc., etc.) was used, to obtain sufficient material for colorimetric comparison.

A uniform application of heat was effected, whenever needed, by imbedding the series of test tubes under observation to an equal depth, into a sand-bath, heated to about 80° C.

Whenever comparisons of color became necessary to decide whether a deeper color had been produced than that of the unaffected reagent (as was especially necessary with the yellowish solution of the German Pharmacopœia), or whether a greater or less intensity of color characterized the reaction, narrow graduated cylinders, of 10 cc. capacity, were used in a dark box, with light reflected from beneath, or occasionally, for still greater accuracy, a pair of Hehner's colorimeter cylinders of 100 cc. capacity, also placed for observation into a dark box, admitting from beneath light reflected upward by a plate of milk glass, placed at an angle of 45°.

With the aid of these appliances the following results were obtained:

(*a*) With the U. S. P. solution of stannous chlorid, of specific gravity 1·467, 1 cc. of each of the three specimens, containing 0·5 mgm. of As was mixed in the different proportions stated below and kept at ordinary temperature for one hour.

With 1 cc. of reagent a sharp reaction had taken place at the end of the hour.

With 2 cc. of reagent the reaction was obtained earlier and was more intense at the end of one hour.

With 3 cc. of the reagent, the reaction was still more speedy, and at the end of the hour more intense.

No difference could be noticed either in time or in intensity between arsenic in the state of trioxid or pentoxid.

When the test tubes were arranged exactly as before, but placed in hot sand, the time was somewhat shortened, and a slight increase of intensity noticed in all of the specimens.

(*b*) When 1 cc. of the U. S. P. solution was used with 1 cc. of solutions containing 0.5 mgm. of As and a small piece of metallic tin added, and heat applied, the reaction was almost instantaneous, and in 3 minutes very sharp, unmistakable coloration appeared, which continued to increase in intensity for about 10 or 15 minutes, but was not notably darker at the end of the hour. No difference appeared in the different solutions containing arsenite or arsenate.

(*c*) When from 1 to 3 cc. of the stannous chlorid solution of the German pharmacopœia was used with 1 cc. of the solutions containing 0·5 mgm. of As, there was a slight darkening of the color in a few minutes, which continued to increase to the end of the hour. No difference was perceivable between the arsenious and the arsenic preparations. At 15 minutes, the specimens treated by U. S. P. solution and metallic tin showed a much greater intensity of color, but toward the end of the hour there was but little difference perceptible between the color of the specimens treated with 3 cc. of the German reagent, without heat, and that treated with 1 cc. of the U. S. P. reagent, metallic tin and heat. The specimens containing less than 2·5 cc. of reagent showed a less intense color.

These experiments were repeated with the three solutions containing 0·05 mgm. As in 1 cc. and resulted as follows:

(*a*) With the U. S. P. solution of $SnCl_2$:

1 cc. of reagent gave no reaction during 45 minutes; then gradual coloration began. If heat be applied the reaction begins in 18 minutes, and at the end of one hour is slightly more intense than when treated without heat.

1·5 cc. of reagent: reaction slightly more rapid and intense than with 1 cc.

2·0 cc. of reagent: still more rapid and intense, both with or without heating.

2·5 cc. of $SnCl_2$: reaction begins in 15 minutes at air temperature, in less than 5 minutes when heated.

3·0 cc. of $SnCl_2$: reaction slightly less intense than with 2·5 cc., both hot and cold.

3·5 cc. of reagent: a still further slight decrease in intensity.

No difference could be observed in the reaction of As_2O_3 and As_2O_5; the sodium metarsenite appeared to be very slightly more colored than As_2O_3.

(*b*) With 1 cc. of U. S. P. solution and a small piece of metallic tin, at a temperature of about 80° C., 1 cc. of the solutions containing 0·05 mgm. of As began showing a brownish color at 13 minutes. At 35 minutes the reaction was quite sharp and continued to grow slowly in intensity to the end of the hour.

No difference was perceptible between As_2O_3 and As_2O_5.

(*c*) 3 cc. of the solution of the "Arzneibuch," mixed with 1 cc. of the solutions containing 0·05 mgm. of As began showing a feeble reaction at 35 minutes, and at the end of the hour showed a plain reaction, as compared with the unchanged solution, but did not equal in intensity the reaction produced by the addition of metallic tin.

On repeating the experiments with solutions containing 0·03 mgm. of As in 1 cc. a feeble reaction resulted from the use of stannous chlorid and metallic tin at the end of an hour, but even after standing over night the other methods gave such a faint reaction that it required close inspection in the colorimeter to perceive the change. A solution containing 0·02 mgm. of arsenic failed to show any reaction. So I think that, *for practical purposes*, the utmost limit of reaction is reached at 0·03 mgm. of As in 1 cc., and that the method employing metallic tin and heat is to be preferred, where the presence of antimony or bismuth does not forbid its use. Even the addition of pure concentrated sulphuric acid, which was recommended when the test was first introduced, has not yielded to me any substantial advantage in detecting the presence of arsenic in the greater dilutions.

2. THE BEST PROPORTION OF REAGENT TO SPECIMEN.

In the foregoing experiments and a number of others conducted for that purpose, it was observed that both with the U. S. P. solution (without the use of metallic tin) and with that of the German

Pharmacopœia, the greatest intensity of color obtained after an hour's reaction occurred when 1 cc. of the arsenical solution was mixed with 2·5 cc. of the reagent. Between 3 cc. and 2 cc. of the German solution hardly any difference could be found; but with the pale U. S. P. solution a very slight difference appeared in favor of 2 cc. as against 3 cc. Heat did not appear to affect the proportion needed.

When metallic tin was added it seemed to be best to use equal volumes of specimen and reagent, although the variable amount of dark coatings of reduced arsenic adhering to the tin prevented an accurate comparison.

3. INFLUENCE OF THE USE OF METALLIC TIN TOGETHER WITH STANNOUS CHLORID.

When metallic tin is heated with pure concentrated hydrochloric acid, a copious evolution of hydrogen results. When heated with the saturated solution of stannous chlorid in hydrochloric acid, the evolution of hydrogen is but scant. When arsenic is mixed with the solution, the evolution of gas is perceptible, but very feeble. Very little arsin appears to be evolved, for a paper cap with a drop of acidulated silver nitrate does not show any evidence of reduction by AsH_3 for over fifteen minutes, and even at the end of an hour but a very faint arsenic reaction is seen. To ascertain whether any of the arsin formed, would react with the stannous chlorid and thus hasten the reduction of As, I arranged a small apparatus in which a copious current of arsin, mixed with hydrogen, was generated and, after passing through a bottle filled with dry cotton, was permitted to bubble through stannous chlorid solution of the U. S. P. After more than an hour's time, not a trace of coloration could be detected.

So that after arsin has once been formed, it is not again decomposed by stannous chlorid. Hence the prompt action of metallic tin must depend upon the nascent hydrogen, which aids the stannous chlorid in reducing the trioxid and pentoxid.

But however satisfactory the action of metallic tin in accelerating and intensifying the reduction of arsenic, it cannot be employed to detect arsenic in preparations of bismuth or antimony; for the metallic tin reduces both of those metals and precipitates them from their solution as black flocculi which aggregate into small granular

lumps. There could be a distinction made between the firm flocculi of Sb or Bi and the finely divided brown particles of arsenic, but it would hardly be safe to trust to this appearance for a sufficient evidence of the presence of arsenic, and the preparations of Bi and Sb must be tested without the aid of metallic tin.

A number of specimens of pure bismuth and antimony salts were tested with the U. S. P. and the German solution of stannous chlorid in various proportions; but neither at ordinary temperature, nor when heated, did the least coloring occur.

4. INFLUENCE OF THE PRESENCE OF OTHER SUBSTANCES IN THE SPECIMEN TESTED.

The preceding experiments were made with a solution of either arsenic trioxid or sodium arsenite or arsenate in water, other substances being absent. But in testing various chemicals for traces of arsenic there are different conditions, as the arsenic forms only a very small portion of the mixture. In the U. S. P. the Bettendorf test is directed for 11 preparations: For hydrobromic, hydrochloric, phosphoric and sulphuric acid, 1 cc. of the acid is to be tested by mixing with 1 cc. of the reagent, adding a small piece of tinfoil and heating. In case of magnesium sulfate, 1 gm. of the dry substance is to be shaken with 3 cc. of the reagent, metallic tin is then to be added and an hour allowed for the appearance of the reaction; sodium phosphate and pyrophosphate are treated in like manner, but heat applied and 15 minutes' time given.

In the case of antimony and potassium tartrate, antimony oxid, bismuth subcarbonate and bismuth subnitrate, it was intended to test with stannous chlorid alone for an hour, but by an unfortunate misunderstanding of the transcriber, tinfoil was directed to be added, which will reduce Bi and Sn as well as As.

To find whether any of the chemicals directed to be tested by the stannous chlorid method could influence the detection of arsenic, specimens were prepared containing the pure chemicals, shown to be free from arsenic by other tests, and with these small portions of arsenic were mixed, and the tests compared with those in which arsenic was present in equal amount without admixture with the chemicals.

In no case could any difference in the intensity of the test be made out, nor were the differences in the time of the occurrence of

the coloration sufficiently great or regular to justify the assumption that the reaction was impeded or accelerated by the presence of other salts.

CHAS. O. CURTMAN,
Chairman of Research Committee B.

ST. LOUIS, MO., May 27, 1894.

PHARMACEUTICAL NOTES AND COMMENTS.

BY FRANCIS HEMM, PH.G.

Read before the Missouri Pharmaceutical Association, June, 1894.

℞. *'Non Repetitur!*

Of late we have been receiving many prescriptions with the above order either printed or written at the bottom or margin of the prescription blank. That the physicians are in earnest in having this request, or rather command, respected by the prescriptionist, there is no doubt in my mind. It is therefore a timely question for this association to consider and declare its position upon same.

Heretofore we have had no definite understanding or regulation to guide us in the matter, and books of authority on prescriptions and dispensing, among them Wall's Prescription, take the stand that such command on the part of the prescriber is both useless and presumptuous, and is and always has been more honored in the breach than in the observance by pharmacists, because if one refuses to refill his patrons' prescriptions upon his request, he will not alone sacrifice his patronage, but will also fail to prevent refilling, as almost every one of his competitors would do so without compunction.

The privilege granted the patient to have prescriptions refilled at pleasure is undoubtedly abused, as we all know; for who of us has not been called upon by a patient to refill his prescription for rheumatism from six to a dozen times and in some instances possibly for his friends in the neighborhood who were similarly afflicted?

This I concede is an abuse and works an injustice to the prescriber.

Again, we are sometimes asked to refill prescriptions containing opiates, cocaine or other narcotics to which the system becomes habituated, and which in a short time might make the patient a

confirmed slave to their use. Without the knowledge and sanction of the doctor, it is wrong to refill this class of prescriptions.

At times powerful poisons are prescribed to meet individual and special requirements for the time being, which the physician does not desire continued and which might produce bad effects if taken by someone else. Such prescriptions ought not be refilled unless so ordered by the prescriber.

In a great number of instances we compound prescriptions of a harmless nature, containing remedies which the patient, especially the chronic, must take for some time. What ought to be our course in such case? I believe it right and have always respected the physician's request not to refill in any instance, but am I or my good colleague to stand by this principle alone and suffer our disgruntled patron to go elsewhere to be accommodated?

I think it is time that the two professions have a clear agreement on this point, and I should like to see this vexatious matter presented to the American Medical Association through the section on pharmacy for settlement; I believe it would make many doctors and pharmacists better friends.

Linimentum Saponis.

The new directions for making this preparation are not good, as the powdered soap does not readily enter into solution when instructions are followed.

It is best to digest the soap with the water as formerly ordered, until a translucent jelly results, then dissolve it in the alcoholic solution of camphor and oil rosemary. Taking eight grams of dried soap in fine powder in place of ten grams of fresh or moist soap in shavings for 100 grams of product, is an improvement, because it insures a uniform quantity of soap in solution and the amount usually remaining in solution at our average store-room temperatures. Soap in shavings as formerly directed varies very much in the amount of water which it contains, and therefore is not uniform.

Sapo Mollis (*Sapo Viridis, 1880*).

The 1890 U. S. Pharmacopœia directs soft soap to be made from linseed oil. The product is a soft yellowish-brown mass.

The 1880 Pharmacopœia did not specify which fixed oil was used to make it, but merely defined its properties and described its color as a greenish-yellow.

Olive oil, hempseed oil, rapeseed oil, linseed oil, etc., have been variously employed in making green soft soap.

So far our dermatologists have not taken kindly to the new soap and generally prefer the olive oil soap. This applies also to the linimentum saponis mollis (Tinctura Saponis Viridis, 1880).

The title Sapo Viridis is a queer one for a yellowish-brown soap.

Linimentum Ammoniae.

Here we have another liniment with the formula slightly modified by the addition of about 5 per cent. of alcohol, but cottonseed oil is still retained.

My experience with this preparation is that when made with olive oil it is a much finer preparation and is generally preferred by the people and doctors.

I would therefore like to see olive oil substituted again for cottonseed oil.

Spiritus Aetheris Nitrosi.

The new formula, in which sodium nitrite is used and being dissolved in water is mixed with deodorized alcohol in a flask and decomposed with sulphuric acid, yields a fine preparation. The addition of the acid through the funnel tube must be slowly and gradually performed, as the reaction is a violent one.

Distillation goes on without the need of additional heat, as sufficient is generated by the chemical reaction to distill the ethyl nitrite.

The direction, to dissolve the 770 grams of sodium nitrate in 1,000 cc. of water is erroneous, as it requires 1·5 parts of water at 15° C. to dissolve it, or about 1,155 cc.

The method of purifying the distillate with ice-cold water, sodium carbonate and dried potassium carbonate to remove alcohol, acid and water, is a valuable improvement.

The whole process is so easily carried out that every pharmacist ought to find it a pleasure to prepare his spirit of nitrous ether.

Hydrargyrum Cum Creta.

The old formula which directed ether and alcohol for extinguishing the mercury in a mixture of prepared chalk and sugar of milk proved impracticable in the hands of the retail pharmacist.

The new directs to shake the mercury with honey and a little water for ten hours, or until the mercury is invisible under a lens

magnifying four diameters (it is stated that the shaking can be best done by mechanical means).

This no doubt is true.

It is finally to be mixed with the prepared chalk, brought to a creamy mixture with water in a mortar, until thoroughly extinguished, then dried and powdered without trituration.

This process was submitted last winter to my laboratory (senior) class and proved a failure even after careful and hard work and repeated attempts. It may be possible to make it work by mechanical contrivances on a large scale, but is certainly not well adapted to the wants of the retail pharmacist.

An improvement is needed.

Liquor Magnesii Citratis.

The formula generally is good, but why use 120 cc. of syrup of citric acid to a bottle? This is too much and must be too sweet for most people. 60 cc. has always been considered very palatable.

Mangani Dioxidum.

Attention has been drawn to the fact that when this chemical compound is prescribed, the dispenser should be particular to employ only the purified substance.

The commercial powder usually contains about 66 per cent. of the dioxide, while the pure is claimed to contain 90 per cent., and has the objectionable contaminations removed.

The pharmacopœial article is the commercial, but the purified substance is furnished by the manufacturing chemists at, of course, a much higher price, but well worth the difference from the standpoint of the careful prescriptionist.

Collodium Cantharidatum.

The official process directs to exhaust the drug in No. 60 powder with chloroform by percolation (in a percolator for volatile menstrua), recovering the chloroform by distillation and dissolving remaining 15 grams of oily extract in 85 grams of flexible collodion.

I prefer and have for some time used the following method. It somewhat accelerates and cheapens the product:

Exhaust the powdered flies with ether in same kind of percolator as already mentioned, distill off ether from percolate until reduced to 70 parts; add 3 parts of pyroxylin, 5 parts Canada turpentine, 3

parts of castor oil and 19 parts of alcohol; shake until dissolved and set aside to clear up. The German Pharmacopœia directs ether as the menstruum, but makes its cantharidal collodion 100 per cent. strong, quite a difference from ours, which is only 60 per cent.

For general use a 60 per cent. preparation gives satisfactory results, but veterinarians whom I have furnished both 60 and 100 per cent. collodions for their practice, report decidedly best results with the 100 per cent. They also prefer it made thicker than the official preparation.

It has been suggested to make this preparation by dissolving cantharidin in the proportion of 4 grains to 1,000 grains in flexible collodion.

A formula of this kind would simplify matters and would insure more uniformity of action.

ANTOINE-LAURENT LAVOISIER.

By William B. Thompson.

The close of the last and the dawn of the present century point to important epochs in the history of the science of chemistry. The mark of a period lies in the history of its scientific men. These are the centres and sources from which spring development and intellectual progress, and it is truly well for us to gauge the measure of our gain in a faithful retrospect of the life-work of those who have wrought out to demonstration, truths which time and experience expand into the fulness of knowledge.

The mysticism of alchemy had long been laid aside for the light of a truer wisdom—advancing civilization aroused and demanded a spirit of inquiry—speculation yielded to investigation—a flame had been kindled—diligence and patience brought their votaries to the task, and the roll of fame is honored in its inscriptions—Black, Cavendish, Priestley, Scheele, Lavoisier, each of which adds lustre to the sun of human achievement. The fame of these lies in our keeping, and what they have given to the store of knowledge is in part our heritage, of which we should show ourselves to be worthy—worthy in the respect which shall ever be paid to honored memories, and in the homage of future generations at the shrine of science.

The more fully the histories of these illustrious men become comprehended, the more eager will be posterity to accord the fullest

measure of justice to their individual worth, and to the incalculable advantages their discoveries have imparted to human life and to human happiness. Our present memoir has, however, particular reference to Lavoisier—Antoine-Laurent Lavoisier—the centenary of whose tragic death has just lapsed, and just been recorded. Corrupted tribunal and the fury of a Parisian mob consigned him and twenty-seven of his associates to death at the guillotine, in one day, in May, 1794. Thus died, at the age of 51, one who was conspicuously ardent and enthusiastic in the pursuit of knowledge, noble and aspiring in all desires and purposes, devoting an active life to humane and unselfish pursuit. The political situation of France at this time was deplorable in the extreme—recklessness and profligacy ruled the hour. Lavoisier's fatal blunder lay in his acceptance of a political position. The faults with which he was charged were those of his associates, not his. His personal record was above reproach, yet innocence was sacrificed to appease the rancor of jealousy and hate; and in order to show the vindictive spirit which prevailed, Coffinhal, who presided at the trial, is said to have exclaimed, when a plea for Lavoisier was offered, "France has no need for men of science!" The deep darkness of ignorance had not been dispelled a hundred years ago. There were many reasons why France should have exulted in the fame of her philosopher, Lavoisier. At the zenith his name became a word of national fame. Yet, passion and fury held such sway over the minds of evil-disposed men, that it required but the momentary descent of the glittering axe to strike off a head that not even a hundred years will suffice to replace with an equal. The ignominy of death detracts not—the name of Lavoisier will ever remain dominant in the chemical world of the last century. This man rendered inestimable service to his country and to mankind. He was guided and governed by an intelligent philanthropy. He was distinguished as an academician and an economist. He devoted a high order of talent to agricultural chemistry, and gave to his countrymen a knowledge to be practically applied in the cultivation and fruition of the soil. Lavoisier was born on the 26th of August, 1743, at Paris, the same decade of years which ushered in his eminent contemporaries, Priestley and Scheele. His preceptors were Abbe LaCaille in mathematics, Bernard de Jussieu in botany, and Guettard in geology and mineralogy—a trio distinguished in science. Lavoisier's first manuscript essay (1765) was upon the subject of calcium sulphate, or gypsum.

This was chiefly noteworthy in giving for the first time an explanation of the "setting" or hardening of plaster of paris; also noting the chemical alteration in an over-burnt product. The following year he was awarded a medal by the "Academie des Sciences" for the merit of a plan for illuminating large towns. He became a candidate for election to the august body of the Academy, and on the 18th of May, 1768, gained the privilege of a seat on the rear bench. This was in the thick of the dark and stormy days of the Revolution. Yet, amid profoundly disturbing causes, Lavoisier found time to pursue his themes, and during his twenty-five years of connection with the Academy he contributed over two hundred reports upon various and miscellaneous subjects. These covered a wide range in science and natural philosophy. His varied positions of public life and trust, and more especially during his term as Fermier-generale (a State organization controlling the financial system) he became deeply interested in the condition of the peasantry of France, in their agricultural employments and interests. He drew up exhaustive treatises on the cultivation of flax, of the potato, and of the liming of wheat. He established working plans for experimental farms, where methods in cultivation could be demonstrated as well as taught, established depots for the collection of agricultural implements, and codes for the more equal adjustment of tithes and taxes and rentals; also rights in pasturage. The economic condition of Agriculture in France at this time had become extremely wretched —impoverishment everywhere. Farmers had but few beasts; the winter food of cattle was unprovided in many districts; fields were unfertilized; the yield of corn was not greater than five times the weight of the seed. Lavoisier sought, patriotically, through his knowledge, to remedy these distressing evils. He introduced the cultivation of the beet and the potato; he improved and increased the breed of sheep and of cows. Under this wise foresight and philanthropic effort each succeeding year marked a change for the better in the lot of the peasant. In 1793 the crop of wheat had doubled; the number of beasts had increased five-fold. Yet, withal, in the following year, Lavoisier died the death of ignominy at the hands of those whom he had spent his life in befriending and benefiting—wicked, monstrous ingratitude! He was made a victim of popular prejudice, and was an unfortunate citizen of a crumbling, rotten and hopelessly fallen dynasty. Lavoisier was the author of

savings and discount banks, workhouses, insurance societies, establishments for the tutoring of nurses, plans for the formation of canals, and for exploiting the mineral resources of the province.

Thus is presented a history of a brief life, yet that of one thoroughly imbued with the ardor of his nationality—a man of intense zeal and large philanthropic purpose. The gifts of his mind were generously and bountifully given for the benefit of his race. His varied knowledge had no selfish application. He appears to have pursued and investigated truth for the sake of truth. His life is a lesson for the studious. In philosophy and science there is no brighter or more illustrious exemplar than Lavoisier. Let his name be forever honored and revered!

PHILADELPHIA, June 29, 1894.

THE TECHNICAL MANUFACTURE OF COCAINE FROM ITS ACCOMPANYING ALKALOIDS.

ALFRED EINHORN AND RICHARD WILLSTÄTTER.

Translated from the *Berichte der deutschen chemischen Gesellschaft*, **27**, 1523.

BY FRANK X. MOERK.

The manufacture of cocaine from the alkaloids accompanying it is technically effected, as has been known for some years, by boiling these alkaloids with concentrated hydrochloric acid, which results in decomposing them into ecgonine and acids belonging to the aromatic series; from the ecgonine the cocaine can readily be obtained by synthetic reactions. This partial synthesis of cocaine is accomplished by one of two methods: 1. The ecgonine is *benzoylated, i. e.*, converted into benzoyl-ecgonine and this is then *esterized* with methyl-alcohol yielding *cocaine*, the methyl-ether of benzoyl-ecgonine, or more simply benzoyl-methyl ecgonine. 2. The ecgonine can first be esterized forming methyl-ecgonine, and this can then be benzoylated.

The alkaloids occurring with cocaine, which have been obtained in a pure condition, and which are derivatives of ecgonine, like isatropylcocaine and cinnamylcocaine, have been proven to be derivatives of methyl-ecgonine and the aromatic acids; it was therefore reasonable to suppose that other alkaloids which have not as yet been isolated would also be found to be derivatives of methyl-ecgonine. With this supposition the problem was imposed

of preparing methyl-ecgonine directly in the decomposition of these alkaloids, thereby simplifying the technical manufacture of cocaine from this source.

We have found that this problem is easily solved if the alkaloids be boiled for several hours with sulphuric or hydrochloric acid in the presence of methyl-alcohol; this gives conditions under which methyl-ecgonine is not decomposed, but, on the contrary, tends to be easily produced or formed.

Fifty gm. of the cocaine accompanying alkaloids are boiled on a water-bath for three to four hours (using, of course, a reflux condenser) with 300 gm. methyl-alcohol and 100 gm. pure sulphuric acid; after distilling off the alcohol, the syrupy residue is poured into water (the quantity of this, however, must not be excessive), the aromatic acids, but more especially their esters (methyl-esters), which are precipitated are removed, and the acid solution extracted with chloroform; the acid solution is next saturated with potassium carbonate, and the methyl ecgonine, which separates as an oily layer, extracted with chloroform.

The same results are obtained when dry hydrochloric acid gas is passed into the methyl-alcohol solution of the alkaloids until the solution, which at first becomes warm, again becomes cold; the solution is then boiled for two hours, using a reflux condenser, and the methyl-ecgonin isolated as just described. The ester, methyl-ecgonine, was obtained in almost theoretical quantity; it was purified by conversion into the hydrochlorate which, recrystallized from alcohol, had the melting point, as stated by Einhorn and Klein, of 212° C. Distilled in a vacuum, methyl-ecgonine gives in the main a distillate free from decomposition products, boiling at 177° C., under a pressure of 15 mm.

If in the process as described ethyl-alcohol be substituted for the methyl-alcohol, there results ethyl-ecgonine instead of methyl-ecgonine. A similar observation was made by Einhorn and Konek de Norwall when in heating dextro-methyl-ecgonine in an ethyl-alcoholic solution of ammonia in a sealed tube to 100° C., they found that there was produced dextro-ethyl-ecgonine. We can add that cocaine can be quantitatively converted into its higher homologue, cocethyline, by boiling for two hours an ethyl-alcohol solution of cocaine which has been saturated with hydrochloric acid gas.

THE CULTIVATION OF GINSENG.

BY THE EDITOR.

Considerable inquiry and report relating to the cultivation of this drug has recently been printed in agricultural journals. As various branches of the drug trade are expected to act as distributors of this commodity, the following information, which appears to come from headquarters, may be of interest.

A correspondent of the *American Cultivator* in New York writes as follows:

I have recently taken up the roots from three beds 3 x 16 feet each, which had been in cultivation, one five years, the others four each. The combined product of the three beds was 1,074 roots, which weighed 73¼ pounds. From these I assorted out 833 roots, weighing 20⅜ pounds, for transplanting again, leaving 52⅞ pounds of clean washed roots to be dried for market. These will make about 17 pounds when dry, worth $3 to $3.50 per pound. The seed produced from the plants during the time was worth at least $40. It will be observed that the stock had been decreased only 241 roots. The beds were set with small, wild roots four or five years ago. The roots originally set were much smaller than those taken off for resetting. Two hundred and thirty-three seedlings, three seasons' growth, weighed 3¼ pounds. I have at this time in my garden 32 beds, 3 x 16, stocked with roots and seeds, only one bed more than three years old. Have over 30,000 seeds in forest culture. It looks to me as though this was a paying business and worthy the attention of gardeners.

American Gardening furnishes the following information, which can easily be verified by anyone who may feel doubt about it:

WHAT GROWERS IN THE BUSINESS HAVE TO SAY ABOUT IT.

In recent years there has been much inquiry about ginseng culture and its possibilities. People in our hilly sections have for years been engaged in digging the wild ginseng (*Aralia quinquefolia*). They had no trouble to find a market for the dried root at paying prices, the demand of the Chinese people for the product, on account of its great but mysterious medicinal properties, being usually larger than the supply. The diggers of the plant, well aware of the great commercial value of the root, have often attempted to transplant the root to their gardens, or to start plants from seed, but have uniformly made a failure of it, either because the plant defies the cultivator's skill, or because no such skill has been brought to the task. We believe that the latter is the case, and that the plant can be made to thrive under cultivation, if the same conditions are provided under which the plant thrives in its wild state.

Evidently the seed is slow to germinate and the root of slow growth. We have feared that this growth was indeed too slow to make the culture of the plant profitable. Recently, however, we have the reports of a few persons who have made a success of ginseng growing. As most of these persons hesitate to give information on the subject, for fear of drawing a considerable number of

people into the business, thus flooding the market and spoiling prices, it seems that after all there may be good money in the culture of the root.

The following are communications received from ginseng growers in reply to our direct inquiries:

GINSENG GROWING IN KENTUCKY.

Ginseng seed will germinate in six months if proper conditions exist. Two years' growth makes a good salable root. Of course, two or three years' additional growth would make them much larger. I have roots grown direct from the "seed" that are from one half to one inch in diameter, and from five to twelve inches in length, tapering to a small fibre at second year's growth. On an average five to seven roots will weigh one ounce when dried. Ginseng thrives best in moist, fertile soil, in woods where it is lightly shaded. It must have light and air. My nursery is located on a rich, north hillside. The soil is of limestone nature. Timber was walnut, beech, ash, poplar, oak, hickory, dogwood, etc. A rich north-west and north-east slope is good. So is flat land, if not swampy, and in fact any rich, moist, fertile soil. I have a trial bed in open land. Will give it artificial shade. I used virgin soil, humus and leaf mould from the forest to bed with.

The best roots are grown direct from the seed. The quickest and best way to get a start is to plant roots that bear or produce seed. If seeds are planted, they will not produce any seed until the second year, and not many then; but if roots are planted they produce seed first year, and plenty of them if old enough. I have a lot of old roots, taken from the forest and transplanted to my nursery. These I keep to produce seed. Some of them produce from 75 to 100 berries, or from 150 to 200 seeds; some as low as three berries or six seeds. A berry contains one, two, three and sometimes four seeds.

In the fall of 1891 I planted, or transplanted, a bed of roots one year old, cultivated them two years, then I dug them. They weighed all the way from one to two pounds, dry, per 100 roots; average size, one inch in diameter and ten inches long, tapering to a fine fibre. Last year I transplanted one root (eleven years old) taken from the forest. It was nine inches in circumference, fifteen inches long, and weighed nine and three-quarter ounces. This root, if dried, would weigh about three ounces, and would bring 75 cents at $4 per pound.

Somerset, Ky. J. W. SEARS.

FROM A NEW YORK GINSENG FARM.

I am aware that very many efforts to cultivate ginseng have proved failures. This is no evidence that the plant cannot be grown.

Ginseng seed requires eighteen months to germinate. It should not be allowed to get dry, but must be sown as soon as ripe, or may be packed in moist loam, and kept in condition to promote germination one year, and then sown.

Anything in the shape of a ginseng root is salable, but the larger the root the greater its value.

The plant can be grown in any light, rich soil. We find it wild in all kinds of dry soil, but it needs shade, either natural or artificial. We can successfully cultivate it in garden, orchard or forest. My own operations thus far with transplanted roots have been in open garden with artificial shade. From my own experience in this business, I am satisfied that it will pay to cultivate

ginseng, for the commercial value of the root, at $2 per pound. The greatest value of the seed at present is in putting it in the ground to get roots from it.

If one works only for self-interest, it is too much to work up a demand for ginseng seed to make any money out of it.

I have the addresses of four parties in this country who are cultivating the root successfully, but fear to say anything about it lest other people engage in it. I have tried to get in correspondence with them for interchange of experience, but they are "mum."

I know of but one cultivator other than myself who has tried to bring this matter before the public. He has recently written me that the only way he expects to make any money out of the business is by growing the root for the general market (in China).

My grounds are open to all who wish to investigate. I am in the business to stay, so long as I have health to carry it on, and am willing to aid in its development. GEO. STANTON.

Summit Station, N. Y.

RECENT CONTRIBUTIONS TO PHARMACY.

PERU BALSAM.

Peru Balsam.—The numerous conflicting statements in reference to the constituents of Peru balsam and the bark of Myroxylon Pereira led to the following chemical investigation of the balsam, especial attention being paid to the resin contained in the balsam and to the chemical and microscopical characteristics of the bark; for the latter purpose there was available about one kilo. of bark from cultivated trees of Myroxylon Pereira, which bark was brought by Professor Tschirch from the botanical gardens in Buitenzorg, Java:

The previous investigators generally used strong alkalies to separate the oil from the resin dissolved in it; to obviate a possible saponification by this method, the balsam was treated with solvents. One kilo. of commercial Peru balsam, which by careful examinations was proven to be pure, was agitated with eight parts carbon disulphide, the solution decanted and the black residue frequently digested on a water-bath with fresh portions of the solvent; the solutions were united, the solvent recovered by distillation, and the residue taken up with ether, only a small quantity of a brown resin remaining insoluble. The ethereal solution was agitated with a ½ per cent. soda solution until it became neutral in reaction; upon separation and evaporation of the ethereal solution, a pale-brown aromatic liquid consisting of crude Peru balsam oil (cinnameïn) was

obtained, for the purification of which, solution in petroleum-ether had to be resorted to; the small quantity of resin which did not dissolve in this solvent was filtered out and the solution evaporated, when it left a pale-yellow colored liquid which was freed from the persistent odor of the petroleum-ether by repeated solution in ether and evaporation. Cinnameïn, the name given by previous investigators to this oil from Peru balsam, because it was considered to consist chiefly of benzyl-cinnamate, is present to the extent of 62-64 per cent. in the balsam; the physical properties and behavior towards reagents of this oil being well known, attention was directed to its composition. Dried over calcium chloride it was submitted to fractional distillation at ordinary pressure in a current of carbon dioxide; by applying heat very carefully the temperature rose steadily to nearly 300° C. without anything distilling over; (no indications of free benzyl-alcohol boiling at about 200° C. were obtained, although this has been claimed to be present); between 298°-302° C. almost the entire quantity distilled over, leaving only a small quantity of a tarry mass, which, upon cooling, became solid. The too rapid application of heat or an irregular current of carbon dioxide caused decomposition, producing discoloration and a very penetrating odor. This fraction, at about 300° C., was obtained almost colorless and without empyreumatic odor, had a slightly different odor from that of the material distilled, it now being honey-like; the reaction was slightly acid, due to traces of cinnamic acid, produced by a slight decomposition, and which was carried over in the distillation; by saponification with strong potash solution and extracting with ether, the latter solution left, upon distillation, a colorless liquid, boiling constantly at 201°–202° C., yielding benzaldehyde when heated with potassium permanganate solution, and only benzoic acid with chromic acid; these properties are characteristic of *benzyl alcohol.* The alkaline liquid, which was agitated with ether, was acidified with hydrochloric acid; the separated acid, decolorized with animal charcoal and recrystallized, melted at 121° C., and gave no test for cinnamic acid with potassium permanganate; therefore, only benzoic acid was present in the precipitated acid, and the chief constituent of cinnameïn is *benzyl-benzoate.* The small quantity of tarry residue left in the fractional distillation of cinnameïn saponified, and the products isolated yielded *benzyl alcohol* and *cinnamic acid,* boiling constantly and entirely at 202° C. Cin

namyl-alcohol, resulting from the decomposition of styracin, and boiling at 250° C., was not obtainable.

The resin, insoluble in carbon disulphide, was washed with carbon disulphide until all of the free acid was extracted, then it was digested with alcohol, which dissolved all but a very small quantity of a tarry substance; the alcoholic solution was evaporated, the resin dissolved in 2 per cent. soda solution, and the resin reprecipitated from this solution by a current of carbon dioxide; the resin obtained in this manner constituted a light-brown, flocculent powder, but precipitated by the use of hydrochloric acid, the resin formed large lumps, and, consequently, was much darker in color. Repeatedly redissolved in soda solution, reprecipitated by carbon dioxide and dried, this so-called *Peru-resin* formed a bulky, light-brown, slightly aromatic powder, easily soluble in alcohol, alkalies, glacial acetic acid, chloroform and acetone, insoluble in petroleum-ether, and only slightly soluble in ether; warmed with water, it cakes and melts at 70°–80° C. to a brown, tenacious mass, which, upon cooling, can be kneaded and drawn into long threads of a chocolate color; boiled with water, the latter becomes acid to test-paper (although the alcoholic solution is neutral before boiling) and deposits small crystals of an acid character upon cooling, this behavior indicating the resin to be an *ester*. Experiment having demonstrated that the resin, by solution in 2 per cent. soda solution and reprecipitating with hydrochloric acid, is not saponified, the more expeditious method of Kraus for preparing the resin was followed: Peru-balsam was dissolved in a large quantity of ether (about 4 per cent. of a brown residue, changing on exposure to air into a black, pitch like mass, was disregarded; with potassium permanganate, this substance gave no indication of cinnamic acid, although the resin itself gave a very distinct test). The ethereal solution was agitated with a 2 per cent. soda solution, the resin passing into the alkaline solution, while the cinnameïn remains dissolved in the ether; using a large quantity of ether, separation into two layers readily occurred; the alkaline solution, supersaturated with hydrochloric acid, separated the resin and the pre-existing free aromatic acids. By washing with warm water, the resin was freed from the aromatic acids, and then dissolved in 10–15 per cent. soda solution, and saponified by boiling for days; although the resin was precipitated every second day by hydrochloric acid, washed free from the liberated acid, and saponification

continued by use of a fresh soda solution, the complete saponification required from one to two weeks. In this prolonged treatment, two things were noticeable—the continued separation of a crystalline acid and the change in the resin, each precipitation causing it to be lighter-colored and less cakey, until after the completion of the saponification it formed a gritty powder, not melting even under boiling water, and failing, when heated in alkaline solution with potassium permanganate, to give the odor of benzaldehyde, this last reaction easily succeeding with the unsaponified resin. To determine the nature of the liberated aromatic acid, the separated acid and the washings by recrystallization were collected; the former, by its melting point, 133° C., combustion, and behavior towards potassium permanganate, was proven to be *cinnamic acid;* the washings, after being made alkaline, were concentrated and acidified, when another portion of the same acid was obtained, and from the mother liquor of this crystallization by repeated concentrations, was finally obtained a crop of crystals, not giving the cinnamic acid reaction, melting at 121° C., and by ultimate analysis agreeing with the formula of *benzoic acid;* the quantity of the latter acid was trifling, compared with that of the cinnamic acid. These results are analogous to those published by F. Lüdy on benzoin (Am. Journ. Pharm., 1893, 223 and 459); the tests described by him for the basic or alcoholic constituents (resinols) of benzoin, *benzo-resinol,* and *resinotannol,* were applied to the resinol from Peru-balsam, which can be prepared by a quicker method than the one described, namely, by dissolving the resin in strong soda solution, and heating for 2 to 3 days under pressure, when the saponification was found to be complete; the tests for benzo-resinol are, firstly, solubility in dilute potash solution and precipitation of the potassium compound by the addition of a concentrated solution of potash, amorphous at first, but by boiling becoming crystalline; secondly, the alcoholic solution of one part of the saponified resin, mixed with ten parts of freshly-prepared milk of lime, evaporated to dryness on a water-bath, powdered, boiled with alcohol, filtered, and the filtrate poured into water acidulated with hydrochloric acid, when a flocculent precipitate of benzoresinol was obtained. Neither of these tests succeeded with the alcoholic body from Peru-resin; better results were obtained in trying the test for resinotannol, which consists in adding to the alcoholic solution an alcoholic solution of potash, when a brown precipitate is formed,

which, upon exposure to air, takes up water, becomes black, gradually deliquesces, and, by absorption of carbon dioxide, liberates again resinotannol; by repeating the solution and precipitation it was possible to almost quantitatively change the alcohol from Peru-balsam resin into its potassium compound; this compound is very soluble in water and is decomposable by addition of acids. The resinotannol from Peru-balsam in properties is similar to that from benzoin, but chiefly because of its different ultimate composition it is called Peru-resinotannol. Its properties, as far as they have not already been described, are: Light brown, bulky, odorless powder, neutral reaction, heavier than water, soluble in solutions of alkalies and alkaline carbonates, in acetone, glacial acetic acid and alcohol (water precipitates it again from the last two solvents); carbon disulphide takes up traces, and in petroleum-ether it is insoluble; assisted by moderate heat cinnameïn dissolves it with a brown color; the addition of alcohol to this solution produces no precipitate, but the addition of ether does; it could not be crystallized from any of its solvents; concentrated sulphuric acid dissolves it with red-brown color; hydrochloric acid colors it black (a property also possessed by the oak-phlobaphenes); concentrated nitric acid oxidizes it to oxalic and picric acids; dilute nitric acid produces only picric acid. The following reactions point to its relations to the tannins: In alcoholic solution it produces with lead acetate a yellowish, with potassium bichromate a brownish-yellow precipitate, and with ferric chloride a red-brown precipitate, if water be added to the alcoholic solution until a turbidity is produced. This reaction with lead acetate was used in purifying the compound for analysis, the precipitate suspended in alcohol was decomposed by hydrogen sulphide, the filtrate diluted with water and acidified hydrochloric acid; the precipitated Peru-resinotannol was then obtained free from ash by repeated solution in ammonia and precipitation with hydrochloric acid; the ultimate analysis gave carbon 68·3 per cent.; hydrogen, 6·3 per cent.; oxygen, by difference, 25·4 per cent.; nitrogen was proven to be absent; the formula calculated from the analysis of the pure substance and a number of its derivatives is $C_{18}H_{20}O_5$. The following derivatives were also prepared and analyzed: *potassium derivative*, $C_{18}H_{19}KO_5$; *acetyl derivative*, $C_{18}H_{19}(C_2H_3O)O_5$; *benzoyl derivative*, $C_{18}H_{19}(C_7H_5O)O_5$. The *cinnamyl derivative* could not be obtained pure enough for analysis; neither could a crystallizable or uniform bromine product be obtained.

In addition to the cinnameïn and the resin there was isolated by well-known procedure from the balsam a small quantity not exceeding 0.05 per cent. of *vanillin;* free *cinnamic acid* was found by agitating the balsam with portions of water at 40° C. until the last solution ceased to have an acid reaction, the mixed solutions made alkaline, concentrated and the acid precipitated by hydrochloric acid; although benzoic acid was looked for, it was not found even in the last crop of crystals.

In the examination of Peru-balsam the yield of cinnameïn and resin should be about 64 to 30; should the figures differ considerably from these a separate examination by saponification of these two important constituents should be made to establish the adulteration.

The chemical examination of the bark of Myroxylon Pereiræ by treatment with different solvents gave no clue as to the constituent which, during the destructive distillation, produced the balsam; ether extracted from the *bark which had a very pronounced odor recalling coumarin,* only a very small quantity of a yellow resinous substance possessing the odor of the bark; in this extract neither coumarin, cinnamic nor benzoic acid, nor any of the balsam constitutents were found; a small quantity of wax and a resinous substance entirely different from the balsam resin were all that could be identified. Alcohol extracted only about 0.7 per cent. of a brown resinous mass in which were found an easily decomposable iron-greening tannin, phloroglucin and a phlobaphene-like substance. The microscopical examination revealed secretion-cells only in the primary bark of young twigs; in the older twigs this primary bark is destroyed by the formation of corky tissue. Careful heating of the bark failed to show the formation of the balsam, which must be considered to be a pathological product. In consequence of the wounding of the tree an increased secretion follows, which then gives rise to the balsam upon heating; the increased secretion, judging from analogous cases and from the nature of the Peru-resinotannol is in all probability a tannin-like body.—(H. Trog. Arch. der Pharm., 1894, 70–98).

FRANK X. MOERK.

THE FLOWERING OF BLOODROOT.

John Chamberlain, in *Garden and Forest,* June 13, records his observations as follows: "I have been much interested this spring

in the development of some plants of the common Bloodroot (*Sanguinaria Canadensis*), which have become established in my yard. Early spring was unusually capricious, so that these plants by turns developed rapidly and shivered in the wind, or were buried in full bloom under the snow.

"The single, broad and deeply-lobed Bloodroot leaf, up to the time of flowering, is folded tightly around the flower stalk, and refuses to release it when the solitary white flower is ready to open, so that the prisoner has to force itself out.

"As the petals expand and the summit rises above the leaf-fold, they are obliged to beat the leaf down to make room for themselves, which they do in the course of an hour or so. It is soon found that an elongation of the flower-stem is also taking place, and the flower is soon carried entirely above the leaf, the stem making a growth of nearly two inches in the two hours that attend the opening of the flower. On the second day the leaf relaxes and expands, soon to be followed by other leaves from the root. If there is lacking any evidence of design in plant-growth, the mode of flowering of the Bloodroot ought to furnish it.

"There is another Bloodroot from North Carolina, in occasional cultivation here [Buffalo, New York], which differs considerably from our own, though scarcely distinguished from it by botanists. It has a leaf of similar shape, but of a steel-gray color when young; it flowers later and has a shorter flower stem, which does not appear to possess this power of elongation on the day of flowering. Bloodroot with pink flowers is occasionally found in this vicinity."

ESTIMATION AND SEPARATION OF THE CACAO ALKALOIDS.

This is effected according to Kunze by the following method: 10 gm. cacao are boiled for twenty minutes with 150 cc. of 5 per cent. dilute sulphuric acid, the mixture filtered, the residue washed, the alkaloids precipitated from the filtrate and washings by the addition of phospho-molybdic acid, allowed to stand for twenty-four hours, the precipitate collected, washed with 800–1000 cc. of dilute sulphuric acid, the filter with precipitate is placed in a beaker, covered with baryta water, carbon dioxide passed in to thoroughly precipitate the baryta, the mixture evaporated to dryness in a water-bath, the residue extracted with boiling chloroform and the solution evaporated, dried and weighed.

The alkaloids, almost pure white in color, are dissolved in ammonia and boiled almost to dryness with an excess of titrated silver nitrate solution of about 5 per cent. strength, the precipitate (a silver substitution compound of the formula $C_7H_7AgN_4O_2$) collected, washed and the excess of $AgNO_3$ estimated in the filtrate and washings with a standardized solution of potassium sulphocyanate; one molecule silver nitrate is the equivalent of one molecule theobromine, the quantity of total alkaloids less the ascertained quantity of theobromine equals the quantity of caffeine. Both alkaloids may be recovered and weighed as such; the filtrate and washings in which the excess of silver nitrate was determined are evaporated to dryness and the caffeine extracted with chloroform; the theobromine silver is dissolved in dilute nitric acid, the solution neutralized, evaporated to dryness and also extracted with chloroform.—(Ztschr. f. anal. Chemie) Apotheker Ztg., 1894, 67.

ASPHODEL ROOT AN ADULTERANT OF WHITE HELLEBORE.

Henry G. Greenish, (*Phar. Jour. Trans.* **53**, 873,) has called attention to an adulterated bale of white hellebore recently received by a London firm from Genoa, and said to have been collected in northern Italy. The adulterant is a rhizome, about one and a-half inches in length and half an inch in thickness; it is erect, or nearly so, and often crowned with the brownish remains of smooth amplexicaul leaf bases, or sometimes with the fibres left after their decay. To this rhizome numerous roots, varying generally from three to six inches in length, are attached; near to the rhizome they exhibit a fusiform tuberous enlargement two to four inches long and three-eighths to three-fourths of an inch thick, tapering abruptly to about crow-quill size, and then assuming the shape of an Indian club. This fusiform enlargement of the root is sufficient to distinguish the root from white hellebore. The drug is certainly liliaceous. Many plants belonging to the natural order *Liliaceæ* are characterized by their swollen tuberous roots; the drug in question is probably derived from *Asphodelus albus*, Willd., a plant enjoying a wide distribution over Southern Europe.

As this drug is referred to by Galen both as a medicine and as a nutritious root used, in times of scarcity, as a food substitue by the peasants, its presence in white hellebore would necessarily reduce the value of the latter.

EDITORIAL.

ONE SUGGESTION FOR RELIEF.

In these days, when every week brings us some suggestion for the relief of the pharmacist, it is appropriate to inquire if these propositions have any real value, and if so, whether anything can be done to put them into practice. It must be confessed that many of them lack the one thing needful, namely, the power to apply them; this is especially the case with all of those which propose legal enactments as a means by which to attain the desired object.

During the months of May and June there were numerous meetings of State Pharmaceutical Associations. At these gatherings suggestions were made without number; each member appeared to have his favorite scheme for relief; some of these views were presented in the form of carefully prepared papers; others were forced on the members in the heated discussions which followed the reading of these papers; but it is safe to say that all were forgotten during the time given to "social features," which supplemented the weightier proceedings.

The members in the Missouri and Pennsylvania Associations found relief in written contributions bearing on this subject, while the members in the New York and a number of other associations vented their opinions without much apparent preliminary thought; these latter were in some cases none the less valuable for their spontaneity, as instanced by the remarks of one member in the New York Association, who advanced the idea that too many laws breed anarchy, and every new law creates a new anarchist. These remarks were not made in reference to laws for the so-called relief, but are they not applicable to many of the laws which have for their object the regulation of the drug business?

The above remarks may appear to be chiefly negative, and yet among all the suggestions, most of them from practical pharmacists, we should extract something of lasting value.

Possibly we have a plan presented in a paper before the Pennsylvania Association, and published in the July number of this journal, page 330, that may with profit be adopted. This contribution, by John F. Patton, referred to the National Formulary, and gave a brief history of this publication. The history furnishes valuable and interesting reading, but the remarks which follow are especially worthy of consideration. For instance, he says: "My experience and observation, in a limited way, lead me to the conclusion that the average physician is unfamiliar with this work (The National Formulary), and to a certain extent also, that of the United States Pharmacopœia. "This may account in a measure for his readiness to prescribe any new remedy offered, and his ready acceptance of the extravagant statements made in their praise we must attribute to human credulity." With this preliminary quotation we may pass rapidly on to the suggestion, although every statement of the author would bear repetition. "If the physician accepts the aid of the manufacturer in his practice, he would not refuse the efforts of the local pharmacist in that direction were they offered."

"Let us prove ourselves such competent pharmacists that there will be no question in the mind of any of our physicians as to our ability to prepare any remedy to meet any special case. We can best make our doctor patron ac-

quainted with the merits of the National Formulary by placing in his hands a copy of the work, and would it not be a good stroke of business to do so?"

This suggestion differs from almost all of its contemporaries by being practical, anyone can try it; in some cases, however, there may be a delicacy on the part of the pharmacist about presenting, and on the part of the physician about accepting, the book; cannot this, therefore, become the business of a local association, and thereby remove the personal element?

The National Formulary has already done much for the pharmacist, by removing the mystery which surrounds many of the long-titled syrups, elixirs, extracts, etc., and it can be made to do still more.

The paper on "Starches in Different Commercial Varieties of Cacao," which occupies first place in this number of the Journal, throws considerable light on a somewhat neglected subject. While the author inclines to the belief that we may not be able to distinguish the commercial varieties by the shape of the starch grains, yet it may be suggested that, with a knowledge of the character of these starch grains, the detection of foreign starches in the prepared and powdered cocaos will become comparatively easy.

This investigation has been made possible by the presentation to the College of a liberal collection of the commercial seeds, and it is the intention to have a chemical investigation supplement Professor Bastin's work.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Etude Monographique de la Famille des Globulariées au Point du Vue Botanique, Chimique et Therapeutique, par Le Dr. Edouard Heckel, Professeur à la Faculté des Sciences et à l'Ecole de Medicine, etc., avec la Collaboration de M. le Professeur Schlagdenhauffen, pour la Partie Chemique, et de M. le Dr. J. Mourson, Medicin principal de Marine, pour le Partie Therapeutique. G. Masson, Editeur. Paris, 120 Boulevard Saint-Germain. 1894.

The Globularieæ are a small family of plants mostly natives of the southwestern countries of Europe, but occurring in the Orient and in the Canary Islands. The family consists of a single genus, Globularia, containing, as usually reckoned, about a dozen species. It is one of those small groups of plants which have given systematists a good deal of trouble, *first*, to define their precise relationships to other families of the Gamopetalæ, the Brunoniaceæ, the Dipsaceæ, the Verbenaceæ, the Selagineæ, the Myoporineæ, the Compositæ and the Scrophulariaceæ, with all of which these plants have some notable charactistics in common; and *second*, in determining the number and limits of the species within the order. This number has at different times been now increased, now diminished and now again increased, according to the value which the investigator has placed upon certain structural differences.

This uncertainty in the classification is one of the reasons which urged Dr. Heckel to undertake anew the study of the group, being convinced that a thorough examination of the microscopic structure of the leaves and stems would throw the needed light on mooted points and establish not only the

systematic relationships of the group, but also determine the order of evolution and relationship of the species. Dr. Heckel has not only demonstrated what he set out to do, but he has shown in a most satisfactory way the great value of the study of the microscopic structure of the stem and foliar organs as means of determining systematic relationships. It would take up too much space to state here, in particular, all the interesting results achieved by this line of study, and so for these the reader is referred to the monograph itself.

Another incentive to the study of the group was a desire to ascertain the medicinal value of the species, some of them being quite extensively used as medicines by the French peasantry. He, therefore, associated with him in his work Prof. Schlagdenhauffen and Dr. Mourson, the former to make the necessary chemical, and the latter the therapeutic studies. Both seem to have done their work with thoroughness. The chemical work largely confirms and considerably extends that done by Walz in 1857. It proves that the principal constituent is globularin, a glucoside whose formula is $C_{15}H_{20}O_8$. This is readily decomposed by the action of acids into glucose, water, and a resinous body, globularetin, to which he assigns the formula C_9H_6O. Among the other principles present are cinnamic acid, mannite, small quantities of a peculiar tannin and coloring matters.

The species particularly investigated, were Globularia Alypum, L., G. vulgaris, L., and G. nana, Lam. These were chosen because they were species growing under widely different conditions, and it was desirable to note the influence of external conditions, such as latitude, altitude, amount of sunshine, etc., on the medicinal constituents.

It was found that the species studied agreed closely in their chemical constitution and the conclusion is drawn that environment has much less influence than some other causes in determining the chemical constitution. It is further concluded that probably all the different species of the family are endowed with similar medicinal properties.

Some of the conclusions reached by the therapeutic studies are as follows:

(1) *Globularin* is an antipyretic; it first depresses and then augments arterial tension; it acts directly upon the heart, slowing its pulsations; it increases the appetite and increases the peristaltic action of the intestines; it is a cerebral excitant similar in its effects to caffeine; it decreases the quantity of extractive matter in the urine.

(2) *Globularetin* is purgative and diuretic, increasing the quantity of solids excreted in the urine.

(3) The volatile principle (essence) is diuretic-stimulant.

The monograph covers about two hundred pages, contains five well-executed plates, besides illustrations in the text, and is altogether a creditable piece of scientific investigation. EDSON S. BASTIN.

A Text-book of Medical and Pharmaceutical Chemistry, by Elias H. Bartley, B.S., M.D. Third edition, revised and enlarged. P. Blakiston, Son & Co. Philadelphia. 1894.

This work, which first appeared in the fall of 1885, has now reached a third edition and is much enlarged and improved. It covers very fully the ground usually gone over in the lectures on chemistry in the medical schools. Some features which seem to merit especial mention in looking through it are the

full and satisfactory account of the methods of sanitary water analysis on page 124, followed by a brief statement of the biological examination of the same on page 243, the full section on theoretical chemistry on page 77, and the large space devoted to the subject of physiological and clinical chemistry on pages 509–624. Some few errors have crept in it in connection with the use of proper names. Thus Berthelet on page 99 should be Berthollet; Victor Meyers on page 298 should be Victor Meyer; Barford on page 351 should be Barfoed.

Under essential oils we find no mention of pinene, sylvestrene and the fundamental hydrocarbons of what used to be called terpenes. The bringing in of the essential oils, camphors, resins and gums before any mention is made of the aromatic hydrocarbons, is also in our opinion an ill-advised arrangement. Indeed, the methane derivatives and the aromatic compounds are interspersed in a way somewhat confusing to the student. The book, however, contains much valuable matter in general well presented. It is very neatly finished and makes a convenient text-book. S. P. S.

Bulletin Vol. II, No. 1, College of Agriculture, Imperial University of Japan. This contains a valuable contribution by Dr. Oscar Loew, Professor of Agricultural Chemistry, on "The Energy of the Living Protoplasm," and one "On the Poisonous Action of Di-cyanogen," by O. Loew and M. Tsukamoto. The former of these papers is worthy of especial attention. After a chapter devoted to "Former views on the cause of the vital phenomena," and one on "Modern steps of progress," the author devotes a chapter to his own views on "Living Protoplasm and Chemical Lability." He states that "The name 'living albumen' should be discarded altogether, as it might lead to erroneous conceptions," and that the term "active proteids" much better expresses the meaning, because it includes the whole living matter of the cell.

He considers that these active proteids exist as "exceedingly labil compounds that can be easily converted into relatively stable ones."

Since his theory depends almost entirely on the existence of labil compounds instead of what is usually designated "living protoplasm," we can best understand it by the following explanation, by the author, of chemical lability: "A labil position exists, if, in a molecule, one atom is influenced simultaneously by the affinities of two neighboring atoms.

"Thus lively oscillations are produced, bringing on a great ability for reactions, and an inclination for a spontaneous migration of the labil atom into a stable position." As aldehydes are highly labil compounds, the author believes they occupy an important position in the formation of active protoplasm.

An Illustrated Dictionary of Medicine, Biology and Allied Sciences. Including the Pronunciation, Accentuation, Derivation and Definition of the Terms used in Medicine and the Allied Sciences. By George M. Gould, A.M., M.D. Philadelphia. P. Blackiston, Son & Co. 1894. Pp. 1,635.

This book is not a revision or compilation of a previous work, but is entirely new. Its well-executed illustrations, its encyclopedic character, and its convenient size will at once establish it in the favor of every pharmacist and physician.

Most pharmaceutical and chemical terms are concisely defined in a way not found (if found at all) in the ordinary dictionary. The new synthetic remedies

receive sufficient attention to give one an idea of the chemical character, relationship and uses of each.

The changes have not been too radical, yet sufficient has been adopted to stamp the work as advancing in the progress of phonetic reform.

A number of special tables, which are carefully indexed, are a valuable feature of the work.

The mechanical part of the book is of a high order; the engravings are especially sharp and clear.

The whole is a credit to author, publisher and printer.

Minnesota Botanical Studies. Bulletin No. 9 Part III.

The following valuable contributions make up the contents of this number:

A revision of the Macoraceæ. By Roscoe Pound.

A revision of the Minnesota Grasses of the tribe of Hordeæ. By Francis Ramaley.

A preliminary list of the North American Species of Astragalus. By Edmund P. Sheldon.

Eleventh Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass.

The Russian Thistle. By Lyster Hoxie Dewey, U. S. Department of Agriculture. Division of Botany. Bulletin No. 15.

Contributions of the U. S. National Herbarium. Vol. III. No. 2. This consists of a paper by J. M. Coulter, on "Preliminary Revision of the North American Species of Cactus, Anhalonium and Lophophora." U. S. Department of Agriculture. Division of Botany.

The Post-mortem Detection and Estimation of Strychnine. By Alberton S. Cushman. Transactions of the Academy of Science of St. Louis. Vol. VI. No. 17.

Proceedings of the Thirteenth Annual Meeting of the Alabama Pharmaceutical Association, held at Anniston, May 8 and 9, 1894.

Index-Catalogue of the Library of the Surgeon-General's Office United States Army. Vol. XV. Washington: Government Printing Office. 1894.

Les orchidées a coumarine le faham et ses Succédanés. Par le Dr. Louis Planchon. 1892.

Tableau des caractères des principales écorces de quinquinas Américains. Par le Dr. Louis Planchon. 1894.

Both the above are reprints from *Nouvean Montpellier Medical.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

PHILADELPHIA COLLEGE OF PHARMACY.

The stated quarterly meeting of members of the College was held June 25, 1894, at 4 o'clock P. M. Robert Shoemaker presiding. Fifteen members present. Minutes of last stated meeting and of special meeting read and adopted. Minutes of Board of Trustees for April, May and June read, and, on motion, approved.

Report of delegates to the sessions of the Pennsylvania Pharmaceutical

Association, which met at Reading, June 12th, 13th and 14th, was presented by Dr. C. B Lowe, a synopsis of which is as follows :

"The meeting was held at Reading, Pa., at the famed Neversink Mountain Hotel, overlooking the city 1,200 feet above sea-level; the effect of this altitude, commanding as it does a grand and imposing panoramic view of the landscape of the Schuylkill Valley, was most inspiriting. The general attendance of members was above the average; the interest manifested in the proceedings and in the presentation of the various topics very marked. The social features and the plans perfected by the local committee—Messrs. Raser, Stein and Durham—representing the Reading druggists, were upon a most extended scale of liberality and generosity, every available moment being devoted to the pleasure of guests with an untiring assiduity and courtesy long to be remembered. The following officers were elected for the current year: President, Dr. W. H. Reed, Norristown; First Vice-President, John B. Raser, Reading; Second Vice-President, C. N. Boyd, Butler; Treasurer, Jos. L. Lemberger, Lebanon; Secretary, J. A. Miller, Harrisburg. The next meeting will be held at Eagles-Mere, Sullivan County.

On motion being made to elect delegates to the sessions of the American Pharmaceutical Association, to be held at Asheville, N. C., in September next, the following were nominated, and, on ballot being taken, were declared duly elected: Jos. P. Remington, William McIntyre, Edson S. Bastin, Geo. W. Kennedy, J. H. Redsecker.

On motion, meeting adjourned.

WILLIAM B. THOMPSON, *Secretary.*

AMERICAN PHARMACEUTICAL ASSOCIATION.

Information concerning the next meeting of this Association has been pretty widely distributed. We, however, take occasion to remind our readers that the meeting will take place at Asheville, N. C., Monday, September 3, 1894.

The committees in charge of the various sections have issued circulars requesting papers, in answer to queries submitted. Where none of the queries seem desirable, members are requested to furnish volunteer papers, choosing their own subjects. It may be said that all the queries submitted are worthy of attention by every member. Copies of these queries may be obtained by addressing the respective chairman of each section. These chairmen are:

Wiley Rogers, Chairman of Committee on Commercial Interests, Louisville, Ky.

L. E. Sayre, Chairman of Committee on Scientific Papers, Lawrence, Kan.

R. G. Eccles, Chairman of Committee on Pharmaceutical Education and Legislation, Brooklyn, N. Y.

The headquarters of the Association will be at the Battery Park Hotel, where a special rate of $2.50 per day has been secured. Rooms may be procured in advance by addressing the local Secretary, W. G. Smith, Asheville, N. C.

The following provisional programme has been arranged by the local committee:

MONDAY, SEPTEMBER 3.

10 A.M. Council Meeting; 3 P.M. First General Session; 8.30 P.M. Reception.

TUESDAY, SEPTEMBER 4.

9 A.M. Second General Session; 3 P.M. Section on Commercial Interests; 8.30 P.M. Entertainment.

WEDNESDAY, SEPTEMBER 5.

9 A.M. Section on Scientific Papers; 3 P.M. Carriage Drive; 8.30 P.M. Section on Scientific Papers.

THURSDAY, SEPTEMBER 6.

9 A.M. Section on Education and Legislation; 3 P.M. Section on Scientific Papers; 8.30 P.M. Section on Commercial Interests.

FRIDAY, SEPTEMBER 7.

9 A.M. Section on Education and Legislation; 1 P.M. Excursion to Hot Springs.

SATURDAY, SEPTEMBER 8.

9 A.M. Final Session of the Association.

NOTICE.

Mr. Thos. F. Main, Chairman of the Committee on Transportation of the American Pharmaceutical Association, has resigned, and the President, Edgar L. Patch, has appointed Mr. C. A. Mayo, of 37 College Place, New York City, his successor.

GEO. W. KENNEDY, *Secretary of Council.*

POTTSVILLE, PA., July 3, 1894.

THE MASSACHUSETTS PHARMACEUTICAL ASSOCIATION.

The thirteenth annual meeting of this Association was held 26th to 28th June, 1894, at Worcester, Mass. Over 125 new members were elected during the various sessions. The following officers were elected: President, Frank M. Harris; Vice Presidents, H. F. Rockwell, C. F. Nixon and W. F. Sayer; Secretary, M. L. H. Leavitt; Treasurer, T. B. Nichols.

C. F. Nixon delivered "A talk on the Medicinal Plants Indigenous to Massachusetts." Papers were read by Prof. W. L Scoville, on "Chalk Mixture;" F. T. Drake, on "Adulterations of Powdered Nux Vomica," and John T. Manning, "How to Keep an Index." The next meeting will be held in May, 1895, at Boston.

THE NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

This Association held its sixteenth annual meeting at Saratoga Springs, June 26th to 28th, 1894. One of the features of the occasion was an address by Prof. H. H. Rusby, on "The Rubber Industry in South America."

The following officers were elected for the ensuing year: President, Charles F. Fish; Vice-Presidents, I. C. Chapman, L. A. Baker, E. S. Gregory; Secretary, Clay W. Holmes; Treasurer, W. B. Fuller. Much time of the meeting was occupied with a discussion of the Pharmacy Law. The sentiment of the members was in favor of a "re-registration" amendment to the law now in force. Through the report of the committee, the Association was informed of a number of bills that had been brought before the State Legislature to regulate the practice of pharmacy, among them the perennial one of dispensing poisons in a special bottle; this brought out a full discussion by members of the Association, and the almost universal sentiment was opposed to the adoption of any mechanical device. The meeting next year will be held at Oswego.

ILLINOIS PHARMACEUTICAL ASSOCIATION.

This Association will hold its Fifteenth Annual Meeting at Peoria, August 14th to 16th. An elaborate programme has been arranged; the Retail Druggists' Association of Peoria will entertain the visitors on the evening of the 16th.

INDIANA PHARMACEUTICAL ASSOCIATION.

The members of the I. P. A. met at Evansville, June 13th. The usual enthusiasm which has characterized this Association in the past prevailed to an unusual degree on this occasion. Several valuable and interesting reports were read, and Prof. Louis Diehl, of Louisville, Ky., addressed the meeting on the subject of the National Formulary. He outlined the history of this publication, and related how a plan had been devised by the Kentucky Pharmaceutical Association to make the use of the Formulary more popular among druggists of that State. This plan consisted in having members make preparations in strict accordance with the Formulary and present them at the meeting of the K. P. A.; these were to be examined by a committee and then presented and explained by this committee, at a meeting of the Kentucky Medical Association. The suggestion had been carried out to the letter, some 65 to 70 members having submitted samples. When presented at the meeting of the Medical Association, they attracted more attention than anything else on the programme.

Mr. Leo Eliel read a paper on the "New Pharmacopœia," and Prof. J. N. Hurty, one on "The Alcohol Molecule." The entertainment features were especially attractive. The Association will meet next year at Fort Wayne.

INTERNATIONAL EXPOSITION OF HYGIENIC AND ALIMENTARY PRODUCTS AT ROME.

Next September 20th, will be opened at Rome the Ninth Exposition of hygienic and alimentary products, organized by the International Association for the improvement of hygiene, which has its seat at Brussels (Belgium), and counts among its members the scientific heads of the Old and New World.

Prof. H. E Baccelli, Minister of Public Instruction, consented to accept the Presidency of the Committee of Patronage.

Interested parties can obtain a programme-regulation and all other information at the Secretary's office of the Association, 4, rue de la Linière, Brussels (South).

DR. W. DROIXHE, *President*,
DR. E. GILSON, *Secretary*.